

## CLAIMS

What is claimed is:

1. A formulated resin component for use in a polyurethane spray foam system to produce a polyurethane foam having a density of less than 1 pound per cubic foot, 5 said resin component comprising:
  - a blowing agent;
  - a first polyol having a number-average molecular weight of from 150 to 500 and having at least tetra-functionality;
  - a second polyol having a number-average molecular weight of from 10 3500 to 8000 and having terminal hydroxyl groups; and
  - a curing component having at least one primary amine group and a number-average molecular weight of from 150 to 5000.
2. A resin component as set forth in claim 1 wherein said curing component is present in an amount of from 2 to 15 parts by weight based on 100 parts by weight of 15 said resin component.
3. A resin component as set forth in claim 1 wherein said curing component is present in an amount of from 5 to 12 parts by weight based on 100 parts by weight of said resin component.
4. A resin component as set forth in claim 1 wherein said curing component 20 has a number-average molecular weight of from 250 to 2500.
5. A resin component as set forth in claim 1 wherein said curing component has a hydroxyl number of from 20 to 800.

6. A resin component as set forth in claim 1 wherein said curing component has a hydroxyl number of from 30 to 450.
7. A resin component as set forth in claim 1 wherein said curing component is further defined as a third polyol having said at least one primary amine group.
- 5 8. A resin component as set forth in claim 7 wherein said third polyol is further defined as a tri-functional polyol having three primary amine groups.
9. A resin component as set forth in claim 7 wherein said third polyol is further defined as a di-functional polyol having two primary amine groups.
10. A resin component as set forth in claim 1 wherein said first polyol is further defined as an amine-initiated polyol.
11. A resin component as set forth in claim 1 wherein said first polyol is further defined as an aliphatic polyol.
12. A resin component as set forth in claim 1 wherein said first polyol is present in an amount of from 5 to 25 parts by weight based on 100 parts by weight of said resin component.
13. A resin component as set forth in claim 1 wherein said first polyol is present in an amount of from 10 to 20 parts by weight based on 100 parts by weight of said resin component.
14. A resin component as set forth in claim 1 wherein said first polyol has a 20 number-average molecular weight of from 250 to 550.
15. A resin component as set forth in claim 1 wherein said first polyol has a hydroxyl number of from 250 to 1000.

16. A resin component as set forth in claim 1 wherein said first polyol has a hydroxyl number of from 400 to 825.

17. A resin component as set forth in claim 1 wherein said second polyol is present in an amount of from 5 to 25 parts by weight based on 100 parts by weight of  
5 said resin component.

18. A resin component as set forth in claim 1 wherein said second polyol is present in an amount of from 10 to 20 parts by weight based on 100 parts by weight of said resin component.

19. A resin component as set forth in claim 1 wherein said second polyol has a  
10 number average molecular weight of from 4000 to 7500.

20. A resin component as set forth in claim 1 wherein said second polyol has a hydroxyl number of from 20 to 100.

21. A resin component as set forth in claim 1 wherein said second polyol has a hydroxyl number of from 20 to 60.

15 22. A resin component as set forth in claim 1 wherein said second polyol is further defined as a triol.

23. A resin component as set forth in claim 1 wherein said second polyol is further defined as a diol.

24. A resin component as set forth in claim 1 further comprising additives  
20 selected from at least one of a catalyst, an emulsifier, a surfactant, and a flame retardant.

25. A resin component as set forth in claim 1 wherein said blowing agent is further defined as water and is present in an amount of from 15 to 40 parts by weight based on 100 parts by weight of said resin component.

5 26. A polyurethane foam that is produced from a polyurethane spraying system, is open-celled, and has a density of less than 1 pound per cubic foot and low water absorption, said polyurethane foam being the reaction product of:

a) a resin component comprising;

a blowing agent,

10 a first polyol having a number-average molecular weight of from 150 to 500 and having at least tetra-functionality,

a second polyol having a number-average molecular weight of from 3500 to 8000 and having terminal hydroxyl groups, and

15 a curing component having at least one primary amine group and having a number-average molecular weight of from 150 to 5000, and

b) an isocyanate component comprising diphenylmethane diisocyanate;

wherein said a) and b) are reacted in a volumetric ratio having an isocyanate index of from 15 to 70.

27. A polyurethane foam as set forth in claim 26 wherein said a) and b) are reacted in a volumetric ratio having an isocyanate index of from 25 to 60.

28. A polyurethane foam as set forth in claim 26 wherein said polyurethane foam has a water absorption of less than 10 percent by volume of said polyurethane foam

29. A polyurethane foam as set forth in claim 26 wherein said polyurethane foam has a water absorption of less than 5 percent by volume of said polyurethane foam.

30. A polyurethane foam as set forth in claim 26 wherein said curing component 5 is used in an amount of from 2 to 15 parts by weight based on 100 parts by weight of said resin component.

31. A polyurethane foam as set forth in claim 26 wherein said curing component has a number average molecular weight of from 250 to 2500.

32. A polyurethane foam as set forth in claim 26 wherein said curing component 10 has a hydroxyl number of from 20 to 800.

33. A polyurethane foam as set forth in claim 26 wherein said curing component is further defined as a third polyol having said at least one primary amine group.

34. A polyurethane foam as set forth in claim 26 wherein said first polyol is further defined as an aliphatic, amine-initiated polyol.

15 35. A polyurethane foam as set forth in claim 26 wherein said first polyol is used in an amount of from 5 to 25 parts by weight based on 100 parts by weight of said resin component.

36. A polyurethane foam as set forth in claim 26 wherein said second polyol is used in an amount of from 5 to 25 parts by weight based on 100 parts by weight of 20 said resin component.

37. A polyurethane foam as set forth in claim 26 wherein said second polyol is further defined as a triol.

38. A polyurethane foam as set forth in claim 26 wherein said second polyol is further defined as a diol.

39. A method of forming a polyurethane foam from a polyurethane spraying system, wherein the polyurethane foam has a density of less than 1 pound per cubic foot and low water absorption, said method comprising the steps of:

providing a) a resin component including a blowing agent, a first polyol having a number-average molecular weight of from 150 to 500 and having at least tetra-functionality, a second polyol having a number-average molecular weight of from 3500 to 8000 and having terminal hydroxyl groups, and a curing component having at least one primary amine group and having a number-average molecular weight of from 150 to 5000,

providing b) an isocyanate component comprising diphenylmethane diisocyanate; and

reacting a) and b) in a volumetric ratio of from 1:1.2 to 1:5 such that a) and b) are reacted having an isocyanate index of from 15 to 70.

40. A method as set forth in claim 39 wherein said step of reacting a) and b) is further defined as reacting a) and b) in a volumetric ratio of from 1:1.2 to 1:2 such that a) and b) are reacted having an isocyanate index of from 25 to 60.

41. A method as set forth in claim 39 wherein the step of reacting a) and b) is further defined as spraying a) and b).

42. A method as set forth in claim 41 wherein the step of spraying a) and b) is further defined as mixing a) and b) through a nozzle of a spray gun.

43. A method as set forth in claim 39 wherein the curing component is provided in an amount of from 2 to 15 parts by weight based on 100 parts by weight of said resin component.

44. A method as set forth in claim 39 wherein the curing component has a 5 number average molecular weight of from 250 to 2500.

45. A method as set forth in claim 39 wherein the curing component has a hydroxyl number of from 20 to 800.

46. A method as set forth in claim 39 wherein the curing component is a third polyol having the at least one primary amine group.